

User-Reported Problems September 2013 – August 2014

Resolved User-Reported Problems

- **(12027, 9/12)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: When installing with ifort 12.1.1, a problem fails in input processing w/numerous out of range error messages from subroutine ISTATE. Further investigation shows that H₂ (which it uses) and N₂ both produce a large number of NaN's in the *.pr files.
 - STATUS: RESOLVED (NAA) Found that a variable was incorrectly defined for both Hydrogen and Nitrogen. After correcting the definition of variable 'dpdrho' the tpf files are correctly generated.

- **(13007, 02/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Changed restart frequency on 201 card from 2000 (only dump at card endtime) to 250 (write @ 2.5 sec). On restart, verification file shows NO DIFFERENCES on first restart step, but Vf and Vg are different on advancement two and on final advancement, RHStH is different. Differences are in final bits only.
 - STATUS: RESOLVED (NAA,GLM) Found that the differences are due to small differences in variable 'timehy'. George came up with an update, but it needs refinement for PVM problems. This issue was corrected for PVM problems and the verification file now shows no differences.

- **(13022, 04/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: The verification file reveals differences between Vf and Vg from "i0" to its restart "i1" on the first time step after restart. The difference in the hexadecimal digits occurs in the 20th and 21st digits respectively.
 - STATUS: RESOLVED (NAA) This problem is related to UP#13007. The observed differences are due to small differences in the calculation of variable 'timehy'. This needs to be investigated further. Problem #13007 was resolved which corrected this problem as well.

- **(13026, 04/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Deck varvol2.i0 produces a verification file that differs with the verification file of varvol2.i1, its restart, only in the TH system RHS sum. This occurs only on the final step.
 - STATUS: RESOLVED (NAA) This problem is related to UP#13007. The observed differences are due to small differences in the calculation of

variable 'timehy'. This needs to be investigated further. Problem #13007 was resolved which corrected this problem as well.

- **(13028, 04/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: For the first case of the two-phase pump model input deck, called twophspmp in the verify suite, small differences in the last decimal places of all non-zero summed quantities in the last time step, but the first shows no differences.
 - STATUS: RESOLVED (NAA) This problem is related to UP#13007. The observed differences are due to small differences in the calculation of variable 'timehy'. This needs to be investigated further. Problem #13007 was resolved which corrected this problem as well.

- **(13029, 04/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Deck jetmpm.i1 reads to the end of the restart file without finding the record (Adv. 600 @ 30.0) that is marked as being written by : jetmpm.i0. Probable cause is in cmpmod.
 - STATUS: RESOLVED (NAA) Modified the restart read for the jetpump in module CMPMOD to match the restart write. This allowed the problem to run, however there are differences in the verification files. This problem is related to UP#13007. The observed differences are due to small differences in the calculation of variable 'timehy'. This needs to be investigated further. Problem #13007 was resolved which corrected this problem as well.

- **(13030, 04/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: All summed quantities in the verification files of neptunus20m.i0 and neptunus20m.i1 differ both on the first step after restart and on the final step.
 - STATUS: RESOLVED (NAA) Found and corrected potential issues with the restart read for the pressurizer component. Also found that the use of variable 'vlev' as a temporary variable in subroutine LEVSKT resulted in a loss of the value of 'vlev' from the restart. Added an allocatable integer 'vctmp' to hold the values of variable 'vctrlx' temporarily. This corrected the 'vlev' error. Then did a diff of the verification files and found them to still be different. This problem is related to UP#13007. The observed differences are due to small differences in the calculation of variable 'timehy'. This needs to be investigated further. Problem #13007 was resolved which corrected this problem as well.

- **(13031, 04/13)**
 - REPORTED BY: George Mesina, INL

- DESCRIPTION: All summed quantities in the verification files of pitch.i0 and pitch.i1 differ both on the first step after restart and on the final step.
 - STATUS: RESOLVED (NAA) Found that variables needed to be added to the restart read and write routines for module MSIMOD. Added variables 'm_rring1', 'm_rring2', 'm_rring3', 'm_rrids1', 'm_rrids2', and 'm_rrids3'. Also found that variable 'athrot' was being unconditionally reset in subroutine ICOMPEN for inertial valves. Modified the coding so that 'athrot' would only be reset when a new inertial valve was entered. This problem is related to UP#13007. The observed differences are due to small differences in the calculation of variable 'timehy'. This needs to be investigated further. Problem #13007 was resolved which corrected this problem as well.
- **(13037, 06/13)**
 - REPORTED BY: Scott Lucas, NuScale
 - DESCRIPTION: A user reported that results did not match when an 12-5 deck was run for 100 seconds and then the same deck was run for 50 seconds then restarted to 100 seconds. The results matched for the first 50 seconds then diverged on restart. This case was run with a debug executable. The user also reported that when the deck was run with an optimized executable, the results diverged before the restart began.
 - STATUS: RESOLVED (NAA) Found that variable 'hte' was previously set in subroutine MDATA2, but had been removed during the F90 conversion. Set variable 'hte' in subroutine MDATA2 as was previously done, and the plots from the two runs show that the results lie on top of each other. The results are slightly different however. This problem is related to UP#13007. The observed differences are due to small differences in the calculation of variable 'timehy'. This needs to be investigated further. Problem #13007 was resolved which corrected this problem as well.
- **(13038, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: RELAP5-3D version 4.1.1 + updates fails in idetector.f at line 46 when restarting typkindt.
 - STATUS: RESOLVED (NAA) Found that a pointer variable was not allocated for a restart. Allocated this variable on restart. The problem then ran, but there were differences. Found that the kinetics time step routine did not restart correctly. Variable 'lspkin' was automatically reset on a restart, which caused differences. Changed the setting of variable 'lspkin' so that it was only reset if the time-step cards were re-entered on restart. Found that there were still differences in the verification file. This problem is related to UP#13007. The observed differences are due to small differences in the calculation of variable 'timehy'. This needs to be investigated further. Problem #13007 was resolved which corrected this problem as well.

- **(13043, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: All three cases of crit.i produce different L1-norms than the corresponding restart cases at both the first and final advancements. As time advances, the two Case 1 calculations converge. VOIDf, Uf and Ug agree to 16-byte precision at the end. The velocities and energies get closer in all cases. It seems there is something wrong with the restart write/read or the restart start up.
 - STATUS: RESOLVED (NAA) Found some errors in the restart input deck, corrected the errors. Found that there were still differences in the verification file. This problem is related to UP#13007. The observed differences are due to small differences in the calculation of variable 'timehy'. This needs to be investigated further. Problem #13007 was resolved which corrected this problem as well.

- **(13046, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: The first 3 cases have identical verification dumps. Case 12 has all L1 norms the same except RHSth on the last step. All 18 other cases have identical dumps on the first step but differ at the final advancement.
 - STATUS: RESOLVED (NAA) Some recent fixes in the verification file fix some of the errors. Found that there were still differences in the verification file. This problem is related to UP#13007. The observed differences are due to small differences in the calculation of variable 'timehy'. This needs to be investigated further. Problem #13007 was resolved which corrected this problem as well.

- **(13048, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: The first time step verification dumps differ in the last bit of Uf, Ug, Vf, Vg, and SOLth. On the final step the L1 norms agree to only 5 or 6 places.
 - STATUS: RESOLVED (NAA) This problem is related to UP#13007. The observed differences are due to small differences in the calculation of variable 'timehy'. This needs to be investigated further. Problem #13007 was resolved which corrected this problem as well.

- **(13049, 06/13)**
 - REPORTED BY: Nolan Anderson, INL
 - DESCRIPTION: Found that restarts that use the MA18 and PGMRES solvers fail with a core dump in subroutine TSETSL.
 - STATUS: RESOLVED (NAA,GLM) The problem was corrected so that restarts using the MA18 solver now work correctly and no differences are seen after the restart.

- **(13053, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Difference in last decimal place of several L1-norms. This may be resolved with the timehy updates.
 - STATUS: RESOLVED (NAA) This problem is related to UP#13007. The observed differences are due to small differences in the calculation of variable 'timehy'. This needs to be investigated further. Problem #13007 was resolved which corrected this problem as well.

- **(13054, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: All five cases of valve restart with velocities differing by 6 orders of magnitude in Case 1 and 7 in case 3 but are close in the other three cases. They get better or worse depending on the valve. One thing that could cause this would be the restart not having all important valve data on the restart file.
 - STATUS: RESOLVED (NAA) Found that the differences were due to errors in the restart deck. Corrected the errors, the problem fails with a glibc error. The problem now runs due to correction of the allocation/deallocation of variables.

- **(13057, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Comparing Base and "backup after every successful step" runs for the dukterm.i case at the final timestep shows differences: Uf, Ug, VOIDf, QUALa, Vf, Vg, Error, and Cntrl are good to about 8 significant digits. Trips and dtsum match perfectly.
 - STATUS: RESOLVED (NAA) The backup was corrected to obtain identical results in the verification file. This problem is resolved.

- **(13064, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Comparing Base and "backup after every successful step" runs for the httest.i input deck at the final time step shows differences: Ug, dtsum, and Trips are perfect Ug, VOIDf, Vf, Vg, and Temp are good to about the last bit. Error is only good to 3 places.
 - STATUS: RESOLVED (NAA) The backup was corrected to obtain identical results in the verification file. This problem is resolved.

- **(13067, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Comparing Base and "backup after every successful step" runs for the neptunus20m.i input deck at the final time step shows differences: Uf, Ug, VOIDf, Vf, Vg, Error, and are good to 3-5 significant digits. Trips and dtsum match perfectly.

- STATUS: RESOLVED (NAA) The backup was corrected to obtain identical results in the verification file. This problem is resolved.
- **(13070, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Comparing Base and "backup after every successful step" runs for the refbunm.i input deck at the final time step shows differences: Uf, Ug, Vf, Vg are good to about 9-10 significant digits. Temp is good to 5. Error is only good to 1. VOIDf and dtsum match perfectly.
 - STATUS: RESOLVED (NAA) The backup was corrected to obtain identical results in the verification file. This problem is resolved.
- **(13071, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Comparing Base and "backup after every successful step" runs for the reflecht.i input deck at the final time step shows differences: Most calculated values are good to 5-7 digits. Uf is only good to 3. Error is only good to 1. VOIDf, Cntrl and dtsum match perfectly.
 - STATUS: RESOLVED (NAA) The backup was corrected to obtain identical results in the verification file. This problem is resolved.
- **(13072, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Comparing Base and "backup after every successful step" runs for the rtsamppm.i input deck at the final time step shows differences: Uf, Ug, VOIDf, Vf, Vg, and Cntrl are good to 3-5 significant digits. Error is good to only 1. QUALa, Trips and dtsum match perfectly.
 - STATUS: RESOLVED (NAA) The backup was corrected to obtain identical results in the verification file. This problem is resolved.
- **(13076, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Comparing Base and "backup after every successful step" runs for the turbine9.i input deck at the final time step shows differences: Uf, Ug, VOIDf, Vg and Cntrl are good about the last bit. Vf is good to about 10 significant digits. Error is only good to 2 places dtsum matches perfectly.
 - STATUS: RESOLVED (NAA) The backup was corrected to obtain identical results in the verification file. This problem is resolved.
- **(13077, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Comparing Base and "backup after every successful step" runs for the valve.i input deck at the final time step shows

differences: Uf, Ug, Vf, Vg are good to about the last bit. Error is only good to 6 places Cntrl and dtsum match perfectly.

- STATUS: RESOLVED (NAA) The backup was corrected to obtain identical results in the verification file. This problem is resolved.

- **(13097, 09/13)**
 - REPORTED BY: Paul Bayless, INL
 - DESCRIPTION: In running the bubbling steam through liquid problem, mixbub.i, an unphysical step change in the total mass is observed in version 4.1.3. This change was not observed previous to version 4.1.3, and the reason for the change is unknown.
 - STATUS: RESOLVED (NAA) Found that a subtraction of 2 nearly identical values resulted in a value that was slightly larger than 0.0 (~1e-17). This difference caused the code to enter an if-test incorrectly. Added a line of code to zero out the subtraction if the difference was less than 1e-9. This resolved this observed issue.

- **(13100, 10/13)**
 - REPORTED BY: Alessandro Del Nevo, ENEA
 - DESCRIPTION: Alessandro Del Nevo reported as follows:
We are working with R5-3D in the framework of IAEA CRP. Therefore, we are preparing a nodalization of EBR-II.
Attached you can find 2 input decks extracted by the EBR-II nodalization. These should be almost equivalent and differs because in T01 the pipes are connected with BRANCH, whereas T02 has the BRANCH volumes in the PIPES and the PIPES are connected with SINGLEJUN. The pressure drops are completely different. I do not have any explanation: the pressure change between the BRANCH and the PIPE (and vice-versa) is very high.
 - STATUS: RESOLVED (PDB) There were input differences between the two decks; the main problem was that the branches had the pipe roughness input as the hydraulic diameter, which accounted for most of the difference in the pressure drops. With all of the input differences corrected, the printed output results were the same for the two problems. A corrected input deck was provided to Alessandro Del Nevo.

- **(14001, 1/14)**
 - REPORTED BY: Andrea Alfonsi, INL
 - DESCRIPTION: Andrea Alfonsi in INL discovered memory leaks when running RELAP5-3D in conjunction with PHISICS. These occur in RRKINO and RRADHT. For a "large" problem they amount to 1MB to 6MB. No input file was provided, but a line number were supplied.
 - STATUS: RESOLVED (GLM) Several problems were identified. In two cases, an allocatable derived type array was tested for allocation and, if it did not exist, was allocated. The lines of code that followed unconditionally allocated components of the derived type. This is an issue when the derived type pre-existed the statements, as may happen on the

second case of an input deck, because the component arrays already exist. It is exacerbated in parallel when more than one process may attempt to allocate the derived type components separately as is done when running with PHISICS. Also, there are loops that unconditionally run to 999999 for enchs and ench which seem arbitrary and overlarge. Fixes are being tested for the former and the latter is being investigated.

- **(14002, 1/14)**
 - DESCRIPTION: Customer requested several small improvements to the verification programming included input bulletproofing, change of call to enforce final timestep, and changing name of Dump to Kernel.
 - STATUS: RESOLVED (GLM) This problem was corrected.

- **(14003, 1/14)**
 - REPORTED BY: Scott Lucas, NuScale
 - DESCRIPTION: User found Windows-PC debug version of RELAP5-3D 4.1.2 failed on an if-statement comprised of two clauses connected with an or-operand in subroutine ilevel.F. The first protected the second from an out-of-bounds access.
 - STATUS: RESOLVED (GLM,NAA,JHF) Since RELAP5-3D has 37K if-statements, I wrote a program to join all lines of an if-statement and analyze them to reduce the quantity for manual review. The if-statements are output whenever they have an and- or or-operand, and an index variable. The index variable is listed above the if-statement on the output file. Further, if the variable occurs outside an array reference or function call, the variable is listed as "isolated." Among the relap/, environmental/, fluids/, and pvmexec/ directories, only 5 if-statements needed to be rewritten: 1 in dtszlogmod.F, 2 in ilevel.F, and 2 in stateq.F.

- **(14004, 1/14)**
 - REPORTED BY: Suthee Wiri
 - DESCRIPTION: The variables print, m_rring(1,4), m_rring(2,4), and m_rring(3,4) were added to subroutine PLTWRT, and the size of array 'plotdata' was increased by 4 to account for this change. However, the arrays 'plotalf' and 'plotcnt' were not bumped by 4 in subroutine WRPLID as they should have been. This causes a corruption of the plot file for all problems that use the moving problem option.
 - STATUS: RESOLVED (GLM,NAA) Created "Block bt1" in VREQD.H, Added variable nbt1 and array bt1 in VREQS.H, Added conditional read of plotalf and plotnum initialization to WRPLID, Incremented nlpddata by 4 for vargrav in PLOTMOD, and Corrected and activated setting of plotdata in PLTWRT.

- **(14005, 2/14)**
 - REPORTED BY: Daniel Braz, GDEB
 - DESCRIPTION: Electric Boat is having a code failure when using the

moving model. This problem was confirmed to fail on a Linux box and will run if you comment out the 2090N00X cards. When you look at the output file, the i-level output for the transient data has garbage values, not those that were input.

- STATUS: RESOLVED (GLM,NAA) Found that an array was out of bounds in subroutine SEARCH.F. Modified this routine so that the array would not be out of bounds. This problem now runs to completion.

- **(14006, 3/14)**

- REPORTED BY: Fabrizio Magugliani, Ansaldo Nucleare
- DESCRIPTION: Ansaldo Nucleare reported an issue with using the "all" option for strip files. The "all" option provides the user all of the channels for a specific variable. For example, mflowj all would add the mass flow rate for every junction to the strip file. When using this option currently an error is reported that W2 should be in integer format.
- STATUS: RESOLVED (GLM,NAA) The manual incorrectly stated that the "all" option should be used as W2, but it should be used as W3. The manual was corrected. When tested, the "all" option was bypassed because the if-statement tested on nsize rather than nall. Correcting this allowed the expandAll subroutine to run and populate the strip file with all instances of the requested variable. Testing the "all" option reveals two problems after the nsize-to-nall fix.

(1) The strip file puts the "all" information first, even before time. This is inconvenient for the user who must visually search the ASCII output (if ASCII was chosen) for the time variable.

(2) When two "all" variables are selected, the second does not show up. To fix (1), internal subroutine expandALL was absorbed into internal subroutine getStripIndices and rewritten to expand only when an "all" variable is first encountered. By this it means that for three requests with pressure, where the first one does not use "all", the expansion occurs when the first pressure is listed, because otherwise that first pressure would occur twice in the strip file, once for its own listing and once because of "all."

To fix (2), a little more adjusting allowed several variables to be listed with the "all" option and to occur only in the order requested by the user (subject to fix (1)) mixed with the other requests.

- **(14007, 3/14)**

- REPORTED BY: Fabrizio Magugliani, Ansaldo Nucleare
- DESCRIPTION: When a machine dependent binary file is stripped to ASCII, the values on the strip file are all zero.
- STATUS: RESOLVED (GLM) The error was traced to a missing statement in the subroutine that reads machine dependent binary. Since this is read into array PLOTDAT4, but all output goes out to the strip file from PLOTDATA, the following statement was required:
PLOTDATA = PLOTDAT4

Adding this statement immediately after the READ statement into PLOTDAT4 solved the problem.

- **(14009, 3/14)**
 - REPORTED BY: Nolan Anderson, INL
 - DESCRIPTION: The theory for moving problems is not in the manual. It is found in a report, but it was never added to the manuals.
 - STATUS: RESOLVED (NAA,CBD,PDB) The theory was added to the RELAP5-3D manuals. It is now in Volume 1, Section 3.1.12.

- **(14010, 3/14)**
 - REPORTED BY: Cliff Davis, INL
 - DESCRIPTION: The numeric label that accompanies a testda minor edit does not print in the output file. If an input deck has multiple testda uses, it will be difficult to differentiate the different minor edits.
 - STATUS: RESOLVED (GLM) This error traces to IREQUEST where the numeric value was set to blank. A write to memory fixes it.

- **(14011, 3/14)**
 - REPORTED BY: Walt Weaver, mPower
 - DESCRIPTION: A base case produces a plot file in XDR format. This XDR formatted plot file is then stripped into a machine binary format. The problem fails when trying to strip.
 - STATUS: RESOLVED (NAA) Found that variable plotdat4 was not allocated for the mbinary strip. Added an allocate for variable plotdat4 and this resolved the problem.

- **(14012, 4/14)**
 - REPORTED BY: Hope Forsmann, INL
 - DESCRIPTION: When running a problem that is located in another directory as follows
relap5.exe -i a/ed.i -o b/ed.p -r c/ed.r
the plt file reverts to the default plotfl and is written to the relapt5.exe. Currently, you have to use the -p option to specify the plt file name and location.
Since the .r and .plt file are "friends" the default should be to write them in the same directory with the same extension.
 - STATUS: RESOLVED (GLM) For paths that start with "." the plotfile would default to "plotfl" in the same directory as the RELAP5 executable. The coding was incorrect because paths to parental directories begin with the ".." symbol.
The correction is to search backwards through the filename character string in internal subroutine namePlotFile of gninit1 for the "." that marks the extension.

- **(14015, 4/14)**
 - REPORTED BY: Xue Zhou, KIT
 - DESCRIPTION: The KIT compressor problem is that the control system that controls the compressor's speed is not being adjusted by the control system that is supposed to control it in Version 4.1.3. Instead the compressor speed is holding constant at its initial value. It was working in 242.
 - STATUS: RESOLVED (NAA) Variable 'icospd(1)' was not set correctly in the code. Because this variable was not set, the code assumed there was no speed table to be used. This was a conversion error, and was corrected. This problem is now fixed.

- **(14016, 4/14)**
 - REPORTED BY: Nolan Anderson, INL
 - DESCRIPTION: A deck that has a 1-volume pipe component with a sink and source time-dependent volume gives results that are noisy. When a second unconnected system is added to the deck, the results are smooth.
 - STATUS: RESOLVED (NAA) Found that the issue is with the Courant limit. The Courant limit is determined by listing the smallest values of the Courant limit for each active volume in a deck. The default code uses the second value on the list for the Courant limit. For a single volume case (as is the case with the single system deck), the second value on the list is undefined. This causes a violation of the Courant limit by the calculation and the observed error. By adding Card 1 Option 15, this problem is eliminated. Card 1 Option 15 is now the code default, and this problem is resolved.

- **(14018, 6/14)**
 - DESCRIPTION: The problem runs the first two cases fine but fails on the third with a core dump. When run separately, all 8 cases run to completion.
The problem runs with Windows Release configuration but fails with Windows Debug configuration and in Linux. Error traces to an index error in presejf.F line 86 where the subscript of coefm, namely `coefm(jct(4)%offds(2))`, has random values like -5360683942457357825 which appear to be real numbers stored in an integer index.
 - STATUS: RESOLVED (GLM) It was insufficient to initialize just the `jct(:)%offds(2)` array because the next case then failed for a different indexing error. The solution was to zero out the entire element of the `jct`-array before allowing `rsngfw.F` to assign values to various components of the `jct` element. This was accomplished by writing an initialization routine in `junmod.F` that initialies any set of `jct`-like array elements from a start index to an end index. It is called from `rsngfw.F` immediately after `cmp(nc)%junc(1)` is allocated.

- **(14019, 6/14)**

- DESCRIPTION: A user group found that RELAP5-3D failed on the third input case of deck flex_area.i, but that if the cases were separated into individual decks, that all of them ran. The user suspected that since the code failed on at least one multiple case deck, that it also might produce different calculations in multi-case mode. The group requested that multi-case verification be added to the verification test suite.
 - STATUS: RESOLVED (GLM) Created Makefile target "multitest" that invokes multi-case input deck testing, modified documentation. Created "runmulti" target in set_Makefile to perform multi-case testing in a given subdirectory by invoking the "dissect" script. Created Linux C-shell script "dissect" to break apart an input file with N cases into N pairs of input files where the "c" member of the K-th pair runs the K-th input case as if it were standalone and the "s" member of the pair runs the first K cases. The script runs all N pairs and compares the two output files of each pair, creating a ".dif" file. This provides the capability requested.
- (14020, 6/14)
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: The debug version of 4.2.0 has subscript of the array DFD has value 1 which is greater than the upper bound of 0. This occurs in k3dalloc of k3dmod called from subroutine rkin.
 - STATUS: RESOLVED (GLM) Found that variable mg = 0 when the allocation is performed. Variable mg is not documented. It should have been ngrk = rkn_nng = Number of Neutron energy Groups. Inserted mg = ngrk at line 1771 of rkin.F to solve the problem. Now rtsampn.i runs.
 - (14021, 6/14)
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: For 3Dwavecart-ni_ic.i, version 4.2.0 fails in TSETSL at line 365 with index out of array bounds by 1 too high, 195 > 194. This happens for all the nearly-implicit variations of 3Dwavecart.
 - STATUS: RESOLVED (GLM) Fixed this in subroutine INVJT by increasing nijtp by 1 and allocating ijt to nijt+2. However, the code then failed in VIMPLT line 2359, the call to COEV3D, with an access to MAPA(-1). This corresponds to a ghost cell.

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For efficiency, it is faster to allow that access rather than prevent it with if-tests. By allocating MAPA to start at -1, and setting MAPA(-1)=0, MAPA(0)=0, the accesses are protected by other if-tests checking against indices < 1.

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Then coev3d went out of bounds at line 2359 with value 2805 > declared size of 2804.

Solved problem by allocating mapa(-1:nz+1). Then cov3dy went out of bounds at 2806.

Solved problem by allocating mapa(-1:nz+2). This occurs thrice in

BPMOD. Now all 3Dwavecart*-ni*.i problems run.

- **(14022, 6/14)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Version 4.2.0 accesses rkopcf(2580) in RBMKXS at line 158 for problem k3200nk.i. However, the upper bound is -1684300903. This value is repeatable.
 - STATUS: RESOLVED (GLM,NAA) The code fails if array rkopcf is manipulated. Introduction of code to output an error message does not change it. The size in the allocate statement is a reasonable positive value under 2500. Setting the fail flag does not work because the array has a value set immediately after the allocation which causes the code to fail.
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This issue is partially solved by checking that the allocation worked before proceeding and enforcing a stop, before rkopcf is manipulated. If the allocate status flag is non-zero or the size of rkopcf differs from the size allocated, the code writes an error message and quits. The structure of variable rkopcf was modified, with this modification the error is corrected.

- **(14023, 8/14)**
 - REPORTED BY: Paul Bayless, INL
 - DESCRIPTION: An HTTF problem fails immediately on restart from steady state to transient with a banded matrix singularity. The default BPLU solver is being used. The IRUG external release Linux executable version of 4.2.1 is being run.
 - STATUS: RESOLVED (NAA,GLM,PDB) Found that various variables that are allocated in subroutine QFMOVE were not properly initialized. This caused the restart to produce various NaN's. By initializing the arrays this problem is resolved.

- **(14025, 8/14)**
 - REPORTED BY: Stuart Olsen, Palo Verde
 - DESCRIPTION: Stuart Olsen from APS contacted me. He is running RGUI and getting a PIB error saying the tpf file won't open. However, the error comes after the file has been opened and used in the relap run. It only happens when I move the jar out of my compile directory.
 - STATUS: RESOLVED (JHF) I corrected this by putting a / after the tpfdir definition. It appears to be happy now in both directories. I sent a new jar off to Stuart for his use and shared the fixed jar with Nolan for inclusion in other releases.

- **(14028, 8/14)**
 - REPORTED BY: Cliff Davis, INL
 - DESCRIPTION: The code will generate an input error if the pressure is set to 7.0e5 Pa and 664 K for fluid h2on. Also, the cubic interpolation for density as a function of pressure used for h2on is incorrect. The current

cubic interpolation caused the density to be highly non-linear within a box for h₂o, whereas it was nearly linear for h₂o. The pressure interpolation within a box was based on the density and coefficient of isothermal compressibility, kappa, at the corners of the box. The use of kappa is correct along a line of constant temperature, but is not correct along a line of constant internal energy. Therefore, the interpolation provided good results for h₂o, which uses P-T tables, and poor results for h₂o, which uses P-U tables. The old interpolation assumed that the drho/dp term along a line of constant internal energy is a function of density and kappa.

However, drho/dp along a line of constant internal energy is actually a function of density, kappa, beta, heat capacity, pressure, and temperature.

- STATUS: RESOLVED (CBD) An update was provided to correct this issue.

Highest Priority User-Reported Problems Being Worked as Time Permits

- (13009, 02/13)
 - DESCRIPTION: On a restart when “allvols-1” is requested, the actual problem answers change and they change after a single timestep.
- (13018, 03/13)
 - DESCRIPTION: The level.i file tests the level stack connection rules contained in Volume 1 of the code manual. The problem contains two parallel pipes, each of which uses the mixture level tracking model. A junction is used to connect the two parallel pipes. The problem simulates 36 cases that test each possible combination of from/to face connections. The number of level stacks calculated by the code disagrees with the connection rules contained in the manual for 10 of the 36 cases. The code logic should be modified to be consistent with the code manual or the manual should be corrected to accurately describe the actual connection rules. Related user problems are UP 08017, 08042, 10014, 12001, and 12008.
 - STATUS: IN-WORK (NAA) Found that the coding and the manuals do not agree, working on modifications to the coding.
- (13021, 04/13)
 - REPORTED BY: Nolan Anderson for Suthee Wiri
 - DESCRIPTION: A user reported that the vapor temperature in a problem running R-134a increased significantly in 2-phase flow. The cause is unknown, but is speculated to be due to the interpolators, or the fluid itself.
 - STATUS: IN-WORK (NAA) Checked the interpolators and tried a similar problem with water, and saw the same issues. It is believed that the problem is with the condensation heat transfer.

- **(13036, 05/13)**
 - REPORTED BY: Peter Cebull, INL
 - DESCRIPTION: Running an input deck using an AVScript in SNAP and running it separately outside of SNAP gives different results.

- **(13078, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: The backup state.i input deck fails in Case 7 (both base and restart decks run all 24 cases) at plotmod.f line 797. The following message is: * **glibc detected** * ../../relap/relap5.x: malloc(): memory corruption: 0x00002b016e505010 *
 - STATUS: IN-WORK (NAA,GLM) Found that the glibc error is related to the XDR plot file, the plot file format was changed to mbinary and the problem ran to completion. Backup differences were also corrected resolving the differences. The XDR plot file still needs correction.

- **(13079, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: The backup ans.i input deck fails in Case 6 (both base and restart decks run all 9 cases) at plotmod.f line 797. The following message is: * **glibc detected** * ../../relap/relap5.x: malloc(): memory corruption: 0x00002ad4c8691010 *
 - STATUS: IN-WORK (NAA,GLM) Found that the glibc error is related to the XDR plot file, the plot file format was changed to mbinary and the problem ran to completion. Backup differences were also corrected resolving the differences. The XDR plot file still needs correction.

- **(13083, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: The restart input fric.r.i deck fails in Case 13 of 14 at plotmod.f line 797. The following message is: * **glibc detected** * ../../relap/relap5.x: corrupted double-linked list: 0x00000000111b680 *
 - STATUS: IN-WORK (NAA,GLM) Found that the glibc error is related to the XDR plot file, the plot file format was changed to mbinary and the problem ran to completion. Backup differences were also corrected resolving the differences. The XDR plot file still needs correction.

- **(13085, 06/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: The restart httest.r.i input deck fails in Case 9 of 9 at plotmod.f line 797. This is DIFFERENT from UP#13040 which failed in case 6. The following error message is given: * **glibc detected** * ../../relap/relap5.x: malloc(): memory corruption: 0x00002af186da7010 *
 - STATUS: IN-WORK (NAA,GLM) Found that the glibc error is related to the XDR plot file, the plot file format was changed to mbinary and the

problem ran to completion. Backup differences were also corrected resolving the differences. The XDR plot file still needs correction.

- **(13086, 06/13)**
 - REPORTED BY: Steve Piet, INL
 - DESCRIPTION: When the code is released to the IRUG, some members will have Windows 8 platforms. (1) We need to warn users to install on Windows 7 platforms OR (2) we need to add the capability to install on Windows 8. We do have MS Visual Studio capable of building a Windows 8 distribution, but it is installed on Windows 7 computers for lack of a Windows 8 machine. Our Intel compilers will work on any recent Windows platform.

- **(13087, 07/13)**
 - REPORTED BY: Scott Lucas, NuScale
 - DESCRIPTION: An external user reported that the Osmachkin CHF correlation was not documented in the RELAP5 manuals. This needs to be added.

- **(13088, 08/13)**
 - REPORTED BY: Cliff Davis, INL
 - DESCRIPTION: A simulation of the LOFT L3-1 experiment showed that the break flow rate increased significantly after the accumulator emptied and noncondensable nitrogen reached the break. The experiment did not show a corresponding increase in the break flow rate. The problem was traced to updates that were implemented in 2009 to make consistent calculations of volume and junction sound speed in the presence of noncondensables. The problem disappeared when Card 1 Option 3 was turned on, which caused the code logic to return to that used prior to 2009. A simple three-volume test case, which demonstrates the effect of Card 1 Option 3 on the break flow, has been stored on the cluster at `/projects/r5dev/cbd/errors/noncon/break.i`.

- **(13090, 08/13)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: Case 5 of 9 cases of the ans.i problem causes code failure when restarted with input deck ans.r.i which restarts all 9 cases on RELAP5-3D/Version (original coding and with updates). The code was built on the SUN Java Station using intel Fortran 11.1. This restart deck ran all 9 cases to completion in version 4.1.2t + updates on the same computer but with compiler level 10.1.

- **(13094, 08/13)**
 - REPORTED BY: Clay Dai, INER
 - DESCRIPTION: Activating reflood calculation in certain cases may result in the violation of mass conservation. We still could not work it out.

Clay provided a graph of the mass error issue, but no input deck.
The level and type of compiler and operating system are not reported.

- **(13095, 08/13)**
 - DESCRIPTION: A collection of varying volume problems fail in different ways. These problems all have a volume that is expanded then compressed to the starting volume. This problem occurs in an older version of RELAP5-3D.

- **(13096, 08/13)**
 - REPORTED BY: Dan Ludovisi, Sargent & Lundy, LLC
 - DESCRIPTION: Non-realistic results are seen in a model for a long segment of pipe (it takes a while to run it). As can be seen in an attached PDF, the force calculated between junction 42 and junction 61 in pipe 43 appears to be erratic starting from 18 sec to 35 sec. This is most likely due to a rapid cyclical switching in flow regimes in pipe 43, and it is reduced with an increase in L/D ratio.

- **(13098, 09/13)**
 - REPORTED BY: Igor Arshavsky, Western Services
 - DESCRIPTION: User Igor Arshavsky requests information on speedup and testing of RELAP5-3D version 4.0.3 in parallel with OpenMP. Do you have results of OpenMP for LINUX. Do be specific, say, we have LINUX machine with 64 cpus, and I am running RELAP5 with and without OpenMP, what would be run time difference? I am thinking to use Intel Xeon Phi Coprocessor, which is running under LINUX.

- **(13099, 09/13)**
 - REPORTED BY: Paul Bayless, INL
 - DESCRIPTION: Two issues were encountered, using input deck mixbub.i, both with the mixture level tracking model turned on. Using the semi-implicit method, a void fraction inversion occurs after oscillations in the flow regime between slug and annular flow. The bottom volume in the level stack nearly empties, while there is significant liquid in the volume above (and the volume below if the level tracking model does not include the entire pipe). Using the nearly-implicit model, a large mass error occurs after liquid starts to flow out of the pipe; this behavior was seen in earlier versions of the code as well (at least back to 2.4.2). If the mixture level tracking model is turned off, the void profile is reasonable, and there is no large mass error in the nearly-implicit calculation; the semi and nearly calculations are only slightly different.

- **(13101, 10/13)**
 - REPORTED BY: Clint Kendrick, GDEB
 - DESCRIPTION: The problem occurs for a case with heat transfer from saturated air to a cold surface. Condensation occurs which causes a small

amount of liquid to appear. The heat transfer coefficient goes to zero whenever liquid is present in the volume, which seems unreasonable.

- **(14008, 3/14)**
 - REPORTED BY: Scott Lucas, NuScale
 - DESCRIPTION: Portions of Card 1 options 9 and 45 are not accessed by the code because of an "#ifdef card1". Card 1 option 78 is completely unavailable due to the same ifdef. The manual indicates that these options are available for use, but option 78 is not available at all.

- **(14013, 4/14)**
 - REPORTED BY: Paul Bayless, INL
 - DESCRIPTION: A steady state calculation fails after some time with a "Thermodynamic property error with minimum time step, transient being terminated" message, but the location of the failure in the model is not identified.

- **(14014, 4/14)**
 - REPORTED BY: Igor Arshavsky, Western Services
 - DESCRIPTION: In running 2 input decks, the only difference is – in one of them the level tracking option is used. There are 2 valves: 633 for SG draining and 139 is for very small venting, the rest of boundaries are not used.
The first deck is running OK (although heavy numerical instabilities are there, but it is OK from practical perspective).
In running the second deck (with level tracking), after the separator is empty the temperature in the steam generator head (volume 690-02) becomes erratic; the code should abort because of out of thermodynamic range.

- **(14017, 5/14)**
 - REPORTED BY: Hope Forsmann, INL
 - DESCRIPTION: Changes were tested on Windows by running the installation set with executables that were created with the 'before' and 'after' coding. There were a number of unexpected differences on problems that should not have had any differences based on the coding changes. This issue is observed just by running from different working directories. This problem could be due to running with multiple cores on Windows, uninitialized variables, or problems with allocation and deallocation. The Windows results are inconsistent as a result.

- **(14024, 7/14)**
 - REPORTED BY: Stuart Olsen, Palo Verde
 - DESCRIPTION: Stuart Olsen from Palo Verde IS having trouble with RGUI when changing the input parameter locations.
This might be a function of not clicking out of the field after changing it,

or of clicking in the command line area. Or there could be a quirky bug. Turns out that the issue was a missing fluids directory. He added the fluids directory and files and it started working again.

He is still seeing some troublesome behaviors. Depending on how many times you may have executed an input file, or if you did or did not save or load the option file, sometimes the output file has a “.o” file extension and other times it has a “.p” extension. The .p seems to be created the first time around and then it automatically changes it to .o.

Sometimes you need to click the Run button twice before you get output files. Yep, I just verified it again. After deleting the contents of the command: text box, nothing happens when the Run button is clicked. The 2nd click (with the text box now populated), generates files.

In addition, the auto-fill functionality that fills the output files to have the root same name as the input file, it is confused when the user changes one of the directories - it changes the name to input blah blah. So this needs investigated as well.

- **(14026, 8/14)**
 - REPORTED BY: Hope Forsmann, INL
 - DESCRIPTION: An existing paragraph was confusing: The wall drag model in subroutine FWDRAG makes a series of loops over all volume cells. The first series of loops calculates the single-phase friction factors for wet wall and/or dry wall cases and interpolates if both cases are present. The second series of loops tests to see if the fluid is two-phase and, if so, calculates the H.T.F.S two-phase multiplier and, for either single- or two-phase, makes a final calculation of the FWALF and FWALG terms. In subroutine VEXPLT, the FWALG and FWALF terms are combined with other terms to form FRICGJ and FRICFJ, as shown previously. The and terms in Equations(6.2-2) and (6.2-3) are equal to the FRICGJ and FRICFJ terms.

- **(14027, 8/14)**
 - REPORTED BY: George Mesina, INL
 - DESCRIPTION: To reduce the number of issues the code has with uninitialized variables, the data in the derived type arrays in various modules will be examined and zeroed out at the time of allocation and any pointers created will be immediately nullified. This will be an ongoing task.
 - STATUS: IN-WORK (GLM) Various modules and subroutines had their data initialized and nullified.

- **(14029, 8/14)**
 - REPORTED BY: Rodolfo Vaghetto, Texas A&M
 - DESCRIPTION: CHF is not being suppressed when the stdy-st option is selected on the 100 card and the steady-state initialization flag (Word 4 on the 1CCCG000 card) is set to 1.0. If the input file is changed so that the

initialization flag is set to 0.0 (the code uses the input initial temperatures at the start of the calculation), the code works correctly. That is, CHF is suppressed and the heat structure surface does not enter film or transition boiling.

- **(14030, 8/14)**
 - REPORTED BY: Paul Bayless, INL
 - DESCRIPTION: A University of Wisconsin user has reported that they believe the RELAP5-3D condensation model in the presence of noncondensable gases is incorrect. An attached file describes the problem.